UNITED STATES AIR FORCE
611TH AIR SUPPORT GROUP
611TH CIVIL ENGINEER SQUADRON
ELMENDORF AFB, ALASKA

FINAL
HEALTH AND SAFETY PLAN

INSTALLATION RESTORATION PROGRAM (IRP) REMEDIAL INVESTIGATION/ FEASIBILITY STUDY

KOTZEBUE LONG RANGE RADAR STATION, ALASKA

OCTOBER 1994

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October 1994

Prepared by:

TETRA TECH INC.

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Redmond WA 98052

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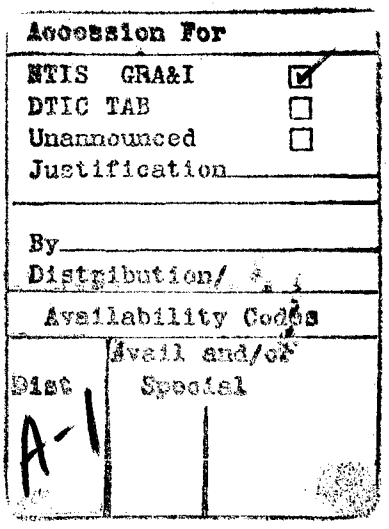

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY (Leave Blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	October 1994	

4. TITLE AND SUBTITLE

Final Health and Safety Plan, Installation Restoration Program Remedial Investigation/Feasibility Study, Kotzebue Long Range Radar Station, Alaska.

5. FUNDING NUMBERS

USAF Contract No. F33615-90-D-4006

6. AUTHOR(S)

Tetra Tech, Inc.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Tetra Tech, Inc.
15400 NE 90th Street, Suite 100
Redmond, Washington 98052

8. PERFORMING ORGANIZATION REPORT NUMBER

N/A

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

Air Force Center for Environmental Excellence
Environmental Services Office
Environmental Restoration Division (AFCEE/ERD)
Brooks Air Force Base, Texas 78235-5328

10. SPONSORING/MONITORING AGENCY REPORT NUMBER SPONSORING/MONITORING AGENCY REPORT NUMBER

N/A

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT

Approved for Public Release. Distribution is Unlimited.

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

This Final Health and Safety Plan describes the health and safety concerns and personal protective procedures associated with Remedial Investigation/Feasibility Study support activites at the Kotzebue Long Range Radar Station in Kotzebue, Alaska.

y14. SUBJECT TERMS

Final Health and Safety Plan

15. NUMBER OF PAGES

116

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL

NSN 7540-01-280-5500 Standard Form 298 (Rev 2-89)

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SITE SAFETY PLAN SUMMARY

SITE: United States Air Force (USAF) Kotzebue Long-Range Radar Station (LRRS).

LOCATION: Four miles south of Kotzebue, AK.

PROPOSED DATES OF INVESTIGATION: June 13, 1994 - August 1, 1994.

DURATION OF ONSITE ACTIVITIES: 45 days.

OBJECTIVE OF INVESTIGATION: To conduct all RI/FS field activities.

TYPE/STATUS OF SITE: Long range radar station; most facilities unoccupied and inactive.

SIZE OF SITE: 676 acres.

LAND USE OF AREA SURROUNDING FACILITY: Open, undeveloped land.

FACTORS PROMPTING INVESTIGATION: A release of petroleum hydrocarbons to soil, surface water, and groundwater and detection of pesticides/PCBs in soil.

CONTAMINANT TYPE: Petroleum Hydrocarbons, and pesticides/PCBs.

ROUTE(S) OF EXPOSURE: Inhalation, ingestion, and skin contact.

PHYSICAL HAZARDS: Traffic hazards, trip/slip/fall, cold stress, heat stress, drilling, excavating, heavy equipment, wild animal attack, and insects.

LEVELS OF PROTECTION: The minimum level of protection is Level D. Elevated concentrations of contaminants may necessitate upgrading to modified Level D or Level C.

AIR MONITORING EQUIPMENT: Photoionization detector (PID) or organic vapor monitor (OVM).

FACTORS PROMPTING MONITORING: PID/OVM - Initial site entry; periodically during sampling activities; changing site conditions.

SITE ACCESS: Access is partially restricted by fencing, controlled by USAF personnel.

PRIMARY EMERGENCY CONTACT:

Mr. Michael Roads
611 CES/CEVR
21885 Second Street
Elmendorf AFB, AK 99506-4420
(907) 552-4532

1.0 INTRODUCTION

This site-specific health and safety plan establishes policies and procedures to protect Tetra Tech personnel from the potential hazards posed by the Installation Restoration Program, Remedial Investigation/Feasibility Study (RI/FS) conducted at the United States Air Force (USAF) Kotzebue Long Range Radar Station (LRRS). It is one of a series of three documents produced for the RI/FS to be conducted at the Kotzebue LRRS. The Work Plan (Tetra Tech 1994) presents a summary of site background information, project objectives, a discussion of RI/FS study tasks, project scheduling, and anticipated reporting requirements. The Sampling and Analysis Plan (Tetra Tech 1994) presents the objectives and procedures for RI/FS field activities. The Quality Assurance project Plan, an attachment to the Sampling and Analysis Plan, presents the procedures to be used to ensure that data collected are valid on a legal and scientific basis. The site health and safety plan provides measures to minimize potential exposure, accidents, and physical injuries that may occur during daily activities onsite and during adverse conditions. It also provides contingencies for emergency situations.

This plan must be observed by all Tetra Tech employees participating in the site investigation. Medical surveillance, personal protection, respirator fit test, and hazardous waste operations training requirements shall be met by all personnel working in any control zone established at this site as specified by the Occupational Safety and Health Administration (OSHA) in 29 CFR 1910. All Tetra Tech observers present during these activities must also comply with all safety requirements of the plan. To help ensure safety compliance, all Tetra Tech field investigation participants and Tetra Tech observers must read this plan and sign a certification stating that they agree to comply with all conditions of the plan (see Appendix A).

1.1 BACKGROUND

1.1.1 Site Location

The Kotzebue LRRS is located on 676 acres of land adjacent to Kotzebue Sound. The installation is located approximately 610 miles northwest of Anchorage and 450 miles west-northwest of Fairbanks

(Figure 1). The City of Kotzebue, Alaska, is accessible by road 4 miles north of the LRRS site and has a population of approximately 3,600 (Figure 2).

1.1.2 Site History

Kotzebue LRRS was originally built as a temporary aircraft control and warning site to fill a radar coverage gap while two permanent sites were being built at Cape Lisburne and Tin City, Alaska. Kotzebue LRRS was equipped with a lightweight search radar when it first became operational in 1950. In 1954, the Alaskan Air Command (AAC) decided to convert the site to a permanent station. Construction of facilities was completed in 1958. Kotzebue operated as a ground controlled intercept site until 1973, when it was converted to a North American Air Defense Command (NORAD) surveillance station. Communications for Kotzebue LRRS were provided by White Alice Communication Systems (WACS) from 1957 until 1979, when a commercial satellite station replaced WACS. In 1977, AAC signed a base operating support contract with RCA Services as part of an Air Force-wide effort to reduce remote tours. Installation of Joint Surveillance System (JSS) equipment was completed in 1982, enabling radar and beacon data to be transmitted by satellite to the Elmendorf Region Operations Control Center (ROCC). These operation modifications left only contractor personnel to maintain the radar. A Minimally Attended Radar (MAR) system was installed in 1985 which enabled deactivation of the site, with the exception of the radome. Radar maintenance technicians are currently housed in the nearby City of Kotzebue (WCC 1990a). Figure 3 includes a map of the major structures and features of the Kotzebue LRRS facility.

Potential contaminants associated with base operations include waste oil, fuels, solvents, herbicides, and pesticides. Past operations such as radar and vehicle shop maintenance at Kotzebue LRRS generated environmental wastes, including waste oils and spent solvents. Waste oils were drummed and stored in waste accumulation areas within facility boundaries. Some waste oils were used for ground application (dust control) on roads. A waste accumulation area and the installation landfill were used to store and dispose of facility wastes, and are located adjacent to Kotzebue Sound. Wastes were regularly buried at the site landfill. In 1972, the waste accumulation area was closed, and in 1974 the landfill was closed. The waste accumulation area and landfill were cleaned and regraded, and drummed wastes were removed from the installation in 1975 (WCC 1990a). Fuels management at Kotzebue LRRS included diesel fuel storage in three large above-ground storage tanks located adjacent to Kotzebue Sound. These tanks provided fuel to smaller fuel tanks located adjacent to the composite facility.

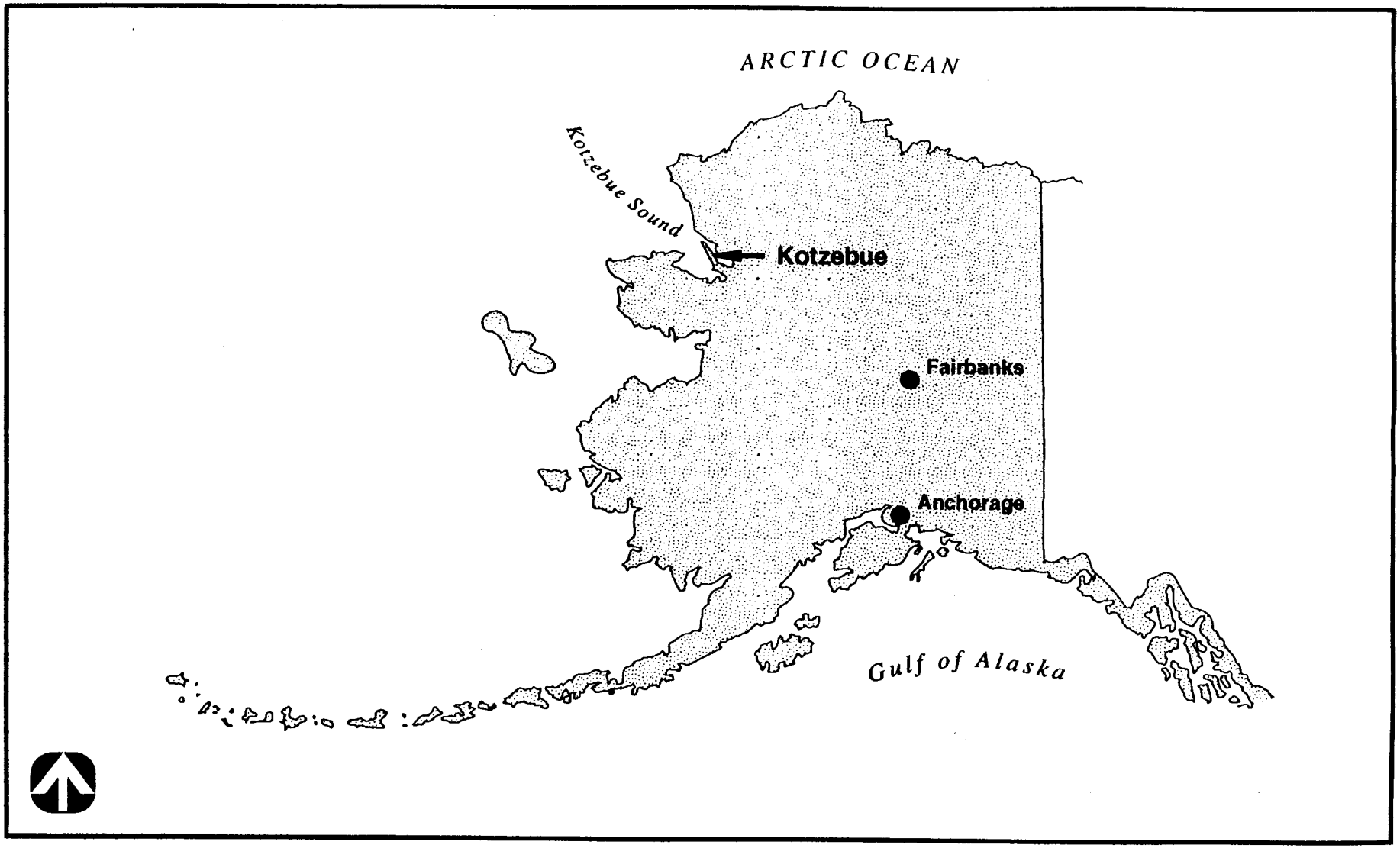

Figure 1. Location Map, Kotzebue, Alaska.

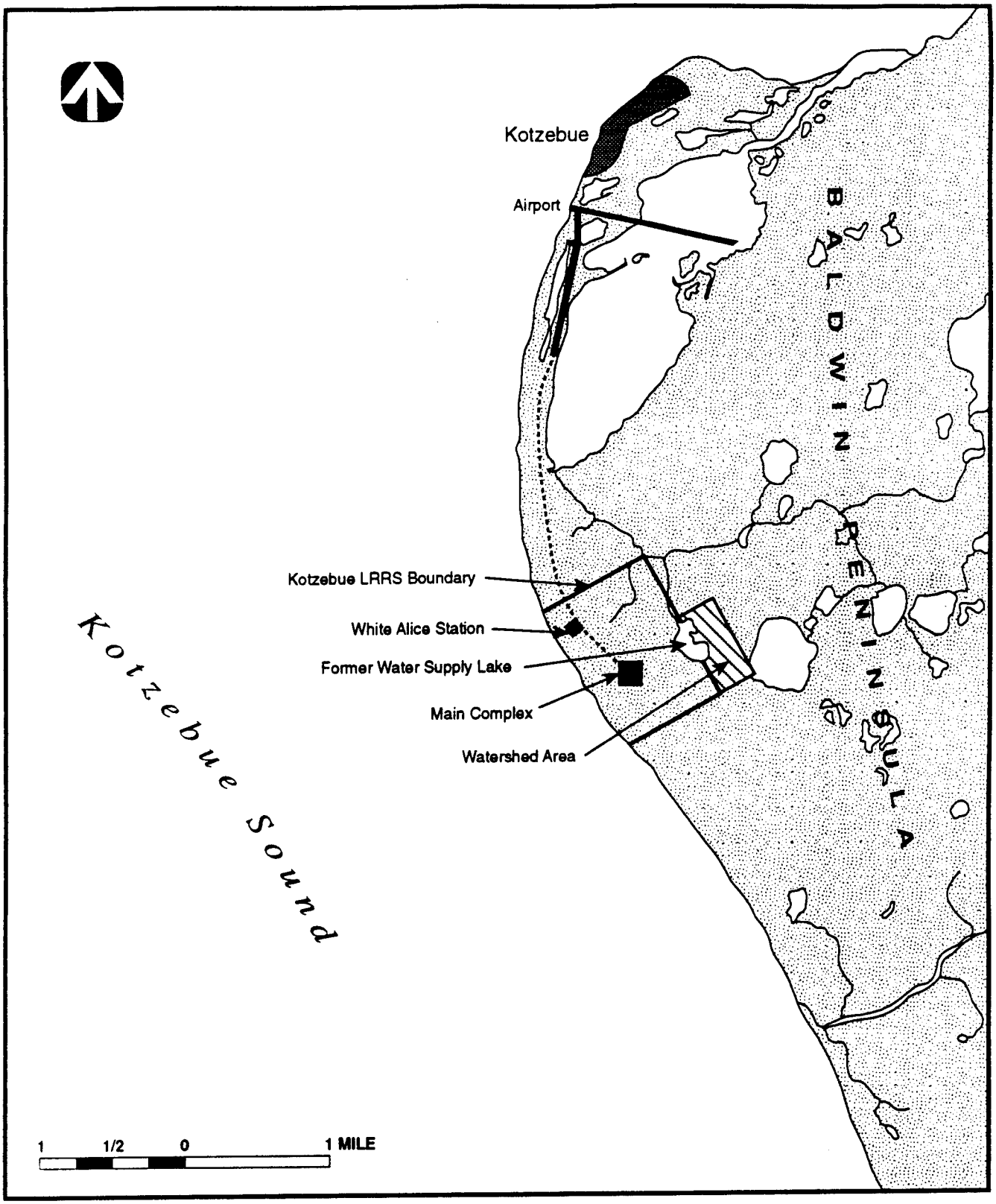

Figure 2. Area Location Map, White Alice Station, Kotzebue Long Range Radar Station (LRRS), Alaska.

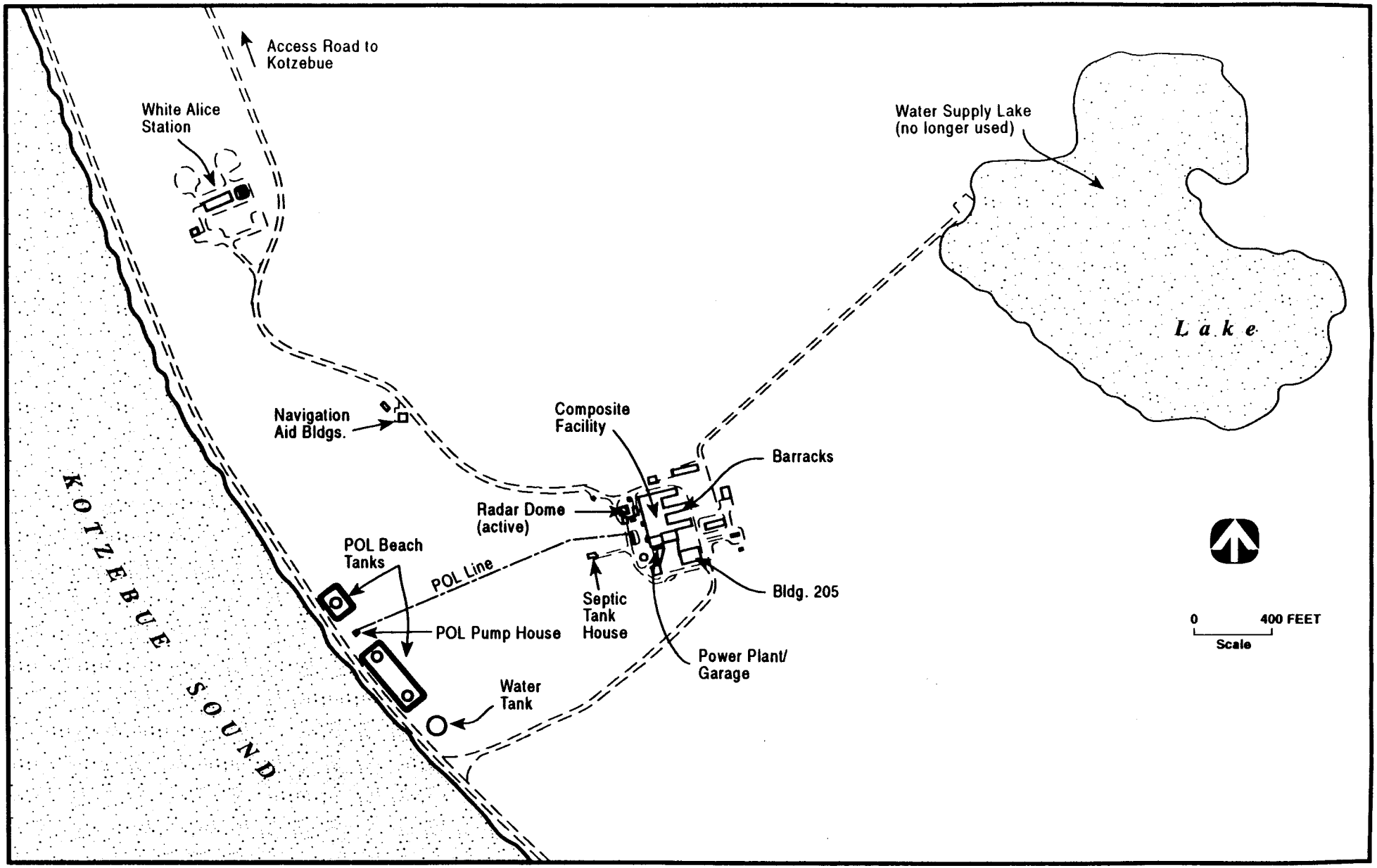

Figure 3. Facility Map. Kotzebue LRRS, Alaska.

The following investigations/remediations have been performed at the Kotzebue LRRS:

- A Phase I Records Search was performed by Engineering Science in 1985.
- A Stage I RI/FS was performed by Woodward-Clyde Consultants (WCC) in 1988.
- A Stage II RI/FS was performed by WCC in 1989-1990.
- Three above-ground diesel fuel storage tanks were removed from a location adjacent to Kotzebue Sound by the USAF in 1992.

Petroleum hydrocarbon contamination linked to past installation operations and activities is the primary environmental problem identified at Kotzebue LRRS. Diesel and jet fuel are the suspected sources of detected concentrations of total petroleum hydrocarbons (TPH) and benzene, ethylbenzene, toluene, and xylene (BETX) in site soils and groundwater. Diesel and jet fuel are middle distillates of crude oil, with diesel fuel containing about 8 percent n-alkanes, 22 percent iso-alkanes, 31 percent cycloparaffins, and 38 percent aromatic compounds that contain approximately 10 percent BETX and 10 percent polynuclear aromatics (PNAs). Diesel fuel blended for Arctic use generally contains lower molecular weight hydrocarbons than does normal diesel fuel (WCC 1990a). Concentrations of aromatic hydrocarbons (such as BETX) were detected at relatively low concentrations in a limited number of soil and groundwater samples collected at Kotzebue LRRS. The single detection of benzene at a concentration of 0.86 mg/kg was identified in a sample of soil from the SS12-Spill No. 3 site, located west of the composite facility. The limited detections of aromatic hydrocarbons in Kotzebue LRRS soils likely results from the low percentage of these compounds in fuels used at the site, and from volatilization and degradation that has occurred since the time of release.

The only PCBs encountered in soils were identified from samples collected at two locations associated with the White Alice Station, at concentrations of 32 mg/kg, and 25 mg/kg. Excavation and removal of PCB contaminated soil from each site was conducted by WCC during Stage 2 RI/FS activities. PCBs were detected at 3.4 mg/kg in a sediment sample collected from the former water supply lake. The potential for PCBs to migrate from the White Alice Station to the lake is considered low based on general site topography, an estimate of the permafrost slope, the extremely low estimated subsurface water flow

rate, and the strong affinity of PCBs to bind to soil organic materials, which dominate the shallow subsurface in the area.

Organochlorine pesticides were detected at low concentrations in soils and lake sediment samples collected at Kotzebue LRRS. The pesticides 4,4'-DDT and Lindane may have been used at the installation to control insects. The compounds 4,4'-DDD and 4,4'-DDE are transformation products of 4,4,-DDT; delta-BHC is a transformation product of gamma-BHC (Lindane).

1.1.3 Conceptual Site Model

A Conceptual Site Model has been developed for the site to integrate available site information, identify additional data needs, facilitate the selection of remedial designs, and guide the risk assessment process. The factors taken into consideration during model development included site geology and hydrology, the contaminant sources onsite and their characteristics, the migration pathways operating onsite, and the potential receptors associated with each migration pathway. A full discussion of the Conceptual Site Model is presented in the accompanying Work Plan (Tetra Tech 1994).

1.1.4 Planned Activities

All field tasks associated with completion of an RI/FS at the Kotzebue LRRS will be performed during the 1994 field effort. Potential field tasks include:

- Hollow stem auger drilling of shallow soil borings.
- Installation of shallow groundwater monitoring wells.
- Collection of groundwater, surface water, sediment, and both subsurface and surface soil samples.
- Tidal monitoring.
- Potential for conducting aquifer test to support remedial alternative assessment.

In addition, potential interim remedial actions may include:

- Above-ground fuel storage tank removals.
- Limited excavation of contaminated fill material with onsite containment.

1.2 PROJECT ORGANIZATION

Efficient onsite operation requires that key personnel be identified and their roles, responsibilities, and scope of authority be clearly defined. The following text identifies key project personnel and their responsibilities.

1.2.1 Technical Project Manager

Mr. Rick Osgood is the Technical Project Manager for Tetra Tech and will be responsible for project oversight. He will interact with the 611 CES and AFCEE representatives, all subcontractors, and the Tetra Tech project team to ensure proper implementation of the work plan. The Field Operations Manager and the Site Safety Officer will report directly to the Technical Project Manager. Mr. Osgood will be responsible for final interpretation of the work plans.

Mr. Osgood will also assume the responsibilities of the Field Operations Manager, as described below, when the Field Operations Manager is unavailable.

Mr. Osgood will act as liaison with local agencies and will notify agencies in the event of a release of hazardous materials into the environment.

1.2.2 Field Operations Manager

Mr. David Hose is the Field Operations Manager for Tetra Tech. Mr. Hose will be responsible for all site operations and will have the primary responsibility for ensuring personnel health and safety, correcting improper conditions, and following safety practices. He will also be directly responsible for implementing this health and safety plan and will act to correct any safety deficiencies. Mr. Hose will also notify the Technical Project Manager in the event of a release of hazardous materials into the

environment. If the Technical Project Manager is unavailable, the Field Operations Manager will act as the liaison with local agencies and notify the appropriate agencies in the event of a hazardous materials release.

1.2.3 Site Safety Officer

Mr. Randal Dyer is Tetra Tech's Site Safety Officer. He will provide technical guidance to the Technical Project Manager and the Field Operations Manager to ensure that all requirements of this plan are followed. As Site Safety Officer, he will establish the control zone and command post locations for each field activity, establish the decontamination procedures, and have the authority to temporarily suspend Tetra Tech onsite operations. Operations may resume only after the appropriate corrective actions associated with the problem have been implemented. Appropriate corrective actions will be developed through consultation between the Technical Project Manager, the Field Operations Manager, the Site Safety Officer, and Tetra Tech's Regional Health and Safety Officer.

1.2.4 Regional Health and Safety Officer

Ms. Carlotta Frommer is Tetra Tech's Regional Health and Safety Officer. Her responsibilities will be to review and approve the site health and safety plan and any subsequent changes to the plan. In addition, she will provide technical support to the Site Safety Officer as needed. If warranted, she will conduct site safety audits to ensure that the site health and safety plan is being implemented correctly.

2.0 HAZARD ANALYSIS

2.1 CHEMICAL

The chemical hazards associated with this site result from potential contact with contaminated soil, surface water, and/or groundwater. Concentrations of PCBs, TPH, BETX, 4, 4-DDT and it's derivatives, and BHC's (delta and gamma) have been identified onsite during previous investigations. These chemicals pose potential respiratory, ingestion, and dermal hazards and may be recognized as toxic materials and/or considered carcinogenic and mutagenic. Specific information on the chemical and environmental health hazards potentially present onsite is presented in Table 1. Previously investigated areas of the site will be sampled during the 1994 RI/FS field effort. Additional unidentified contaminants may be encountered during these field activities. Therefore, it is imperative that field monitoring with a photoionization detector be performed on a regular basis to determine the concentration of volatile contaminants in the breathing zone. Field monitoring techniques are outlined in Section 6.0 of this Health and Safety Plan.

2.2 PHYSICAL

Physical hazards associated with this fieldwork include traffic hazards; hazards associated with drilling and excavation; slipping, tripping, or falling during field activities; cold stress; heat stress; heavy equipment; attack by wild animals; and insect bites.

2.2.1 Traffic Hazards

The road from the city of Kotzebue to the Kotzebue LRRS crosses the Kotzebue Airport runway. Care must be taken when driving from town to the site to look for plans before crossing the runway and to remain observant while on airport property.

TABLE 1. HEALTH EXPOSURE SUMMARY

Hazard	Health Hazard Rating at This Site	Route of Entry	Symptoms of Overexposure	First Aid	Occupational Health Standard 8-h TWA[a]
Benzene	Low: due to expected concentrations. Benzene is a carcinogen.	Inhalation, ingestion, contact	**Inhalation/ingestion:** headache, dizziness, nausea, convulsions, coma, and possibly death. **Contact:** eye and skin irritation.	**Eye contact:** irrigate immediately. **Skin contact:** wash with soap and water. **Inhalation:** move immediately to fresh air. Perform artificial respiration as required. **Ingestion:** seek medical attention. Do not induce vomiting.	1 ppm
Cold stress	Low: due to seasonal environmental conditions. Protection enhanced by use of appropriate clothing.	Environmental exposure, Contact	**Frostbite:** white-grayish skin, blisters, intense numbness, mental confusion, fainting, shock, cessation of breathing, and death due to heart failure.	Cover and protect affected area. Provide extra clothes. Warm frozen area by immersing in water. If thawed and refrozen, warm at room temperature. Discontinue warming as soon as affected area becomes flushed. Do not rub, apply heat, or break blisters in the affected area. Exercise thawed areas and elevate frostbitten parts.	Not applicable
	Medium: during cold, windy, and wet conditions. Protection enhanced by use of appropriate clothing.	Environmental exposure	**Hypothermia:** shivering, numbness, lowered body temperature, drowsiness, and muscular weakness, sometimes resulting in death.	Remove cold, wet clothing. Warm victim by wrapping in blankets or placing in tub of warm water. Administer hot, nonalcoholic liquids.	Not applicable
DDT and Derivatives	Low: due to expected concentrations.	Inhalation, ingestion, contact	**Inhalation/ingestion:** paresthesia of tongue, lips, and face, tremors, apprehension, dizziness, confusion, malaise, headaches, convulsions, paresis of hands, and vomiting. **Contact:** irritation of eyes and skin.	**Eye contact:** irrigate immediately. **Skin contact:** wash with soap and water. **Inhalation:** move immediately to fresh air. Perform artificial respiration as required. **Ingestion:** give large quantities of water and induce vomiting. Get medical attention.	1 mg/m^3
Delta-BHC (hexachlorocyclohexane) and Gamma-BHC (Lindane)	Low: due to expected concentrations.	Inhalation, ingestion, contact	**Inhalation/ingestion:** headaches, nausea, chronic convulsions, respiratory problems, cyanosis, aplastic anemia, and muscular spasms. **Contact:** irritation of eyes, nose, throat, and skin.	**Eye contact:** irrigate immediately. **Skin contact:** wash with soap and water. **Inhalation:** move immediately to fresh air. Perform artificial respiration as required. **Ingestion:** give large quantities of water and induce vomiting. Get medical attention.	0.5 mg/m^3
Ethylbenzene	Low: due to expected concentrations.	Inhalation, ingestion, contact	**Inhalation/ingestion:** headaches, narcosis, coma, kidney and liver disease, chronic respiratory disease, and skin disease. **Contact:** eye, skin, and mucous membrane irritation.	**Eye contact:** irrigate immediately. **Skin contact:** wash with soap and water. **Inhalation:** move immediately to fresh air. Perform artificial respiration as required. **Ingestion:** seek medial attention. Do not induce vomiting.	435 mg/m^3 or 100 ppm

TABLE 1. HEALTH EXPOSURE SUMMARY

Hazard	Health Hazard Rating at This Site	Route of Entry	Symptoms of Overexposure	First Aid	Occupational Health Standard 8-h TWA[a]
Heat stress	Medium: during elevated environmental temperatures.	Contact	Heat rash; heat cramps; heat exhaustion (pale, clammy skin; profuse perspiration; weakness; headache; nausea); heat stroke (hot, dry skin; high fever; dizziness; nausea; rapid pulse; and unconsciousness).	Remove protective clothing; take temperature; cool off with a watery spray; have employee slowly drink 8 oz. of cool water, diluted, unsweetened fruit juice or Gatorade; have employee rest until oral temperature is less than 99^{o} F. If body temperature $>99^{o}$ F, seek medical attention.	If body temperature exceeds 99^{o} F, initiate first aid
Noise	Medium/High: when exposed to operations generating high sound pressure levels (e.g., drilling operation and portable generators). Contact limited by use of hearing protection.	Contact	Stress, tensing of muscles, headache, and temporary or permanent hearing loss.	Remove from noise source. Upgrade protection.	85 dBA
Polychlorinated biphenyls (PCBs)	Low: due to concentration in soil.	Inhalation, ingestion, contact	**Inhalation:** edema, jaundice, vomiting, anorexia, nausea, abdominal pains, fatigue. **Contact:** chloracne (formation of comedones, sebaceous cysts, and pustules).	**Eye contact:** irrigate immediately. **Skin contact:** wash with soap and water. **Inhalation:** move immediately to fresh air. Perform artificial respiration as required. **Ingestion:** induce vomiting by administering large volumes by administering large volumes of water. Seek medical attention.	0.5 mg/m^3
Toluene	Low: due to expected concentrations.	Inhalation, ingestion, contact	**Inhalation/ingestion:** headache, dizziness, fatigue, muscular weakness, drowsiness, incoordination, skin paresthesia, collapse, and coma.	**Eye contact:** irrigate immediately. **Skin contact:** wash with soap and water. **Inhalation:** move immediately to fresh air. Perform artificial respiration as required. **Ingestion:** seek medical attention. Do not induce vomiting.	375 mg/m^3 or 100 ppm
Total petroleum hydrocarbons	Medium: due to expected concentrations.	Inhalation, ingestion, contact	**Inhalation/ingestion:** dizziness, drowsiness, headaches, and nausea. **Contact:** irritation of eyes, nose, throat, and skin.	**Eye contact**: irrigate immediately. **Skin contact:** wash with soap and water. **Inhalation:** move immediately to fresh air. Perform artificial respiration as required. **Ingestion:** get medical attention immediately.	890 mg/m^3
Xylene	Low: due to expected concentrations.	Inhalation, ingestion, contact	**Inhalation/ingestion:** dizziness, staggering, drowsiness, unconsciousness, nausea, vomiting, and abdominal pain. **Contact:** skin, eye, nose, and throat irritation.	**Eye contact:** irrigate immediately. **Skin contact:** wash with soap and water. **Inhalation:** move immediately to fresh air. Perform artificial respiration as required. **Ingestion:** seek medical attention. Do not induce vomiting.	435 mg/m^3 or 100 ppm

[a] TWA = Time-weighted average.

In addition, the roads throughout Kotzebue are gravel covered. These roads are maintained by application of additional gravel on a regular basis. The road through the Kotzebue LRRS is the main access road from the gravel pit to town. All employees must remain aware of their surroundings while working in the vicinity of this road to avoid being hit by oncoming traffic.

2.2.2 Drilling Hazards

Utility lines are not likely to have been buried on the Kotzebue LRRS due to the shallow occurrence of permafrost in the region. However, Tetra Tech will review station as-built plans with the AFCEE representative and the technical representative of the 611 CES to identify potential utility line locations. All utility line and pipe locations identified onsite during the plan review will be clearly marked no more than one week prior to commencement of fieldwork.

Tetra Tech personnel will monitor for organic vapors during all activities performed by the subcontracted drilling firm. Eye and skin contact from contaminated soil, groundwater and/or rocks or other projectiles are also of concern during drilling. Safety glasses will be required for protection from potential eye injury. There is also a potential for very heavy objects to fall onto project personnel during drilling. Therefore, personnel within the exclusion zone will wear a hardhat and steel-toed, steel-shank reinforced work boots during drilling activities.

2.2.3 Tripping, Falling, Slipping Hazards

Personnel may encounter wet or uneven walking surfaces or debris during the Kotzebue LRRS sampling effort. Attention to the facility environment will help prevent potential injuries. Work areas should be kept clean and clear of unused tools and garbage. Steel boot inserts should be worn to prevent puncture wounds.

2.2.4 Cold Stress

During the proposed dates of fieldwork, the Kotzebue LRRS may be subject to low temperatures, rain, and winds. Care must be taken to limit cold exposure by providing proper protective clothing, access to warm shelter, and a temperature-dependent work regimen limiting periods of outdoor activity, if necessary. The Site Safety Officer will monitor weather conditions daily using the existing weather reporting services.

Cold stress can be manifested as both hypothermia and frostbite. Hypothermia is a cold-induced decrease in the core body temperature that produces shivering, numbness, drowsiness, muscular weakness, and if severe enough, death. It is important to note that hypothermia is not always an alarming experience; the victim may feel calm and relaxed. Employees must observe each other for symptoms of hypothermia. Frostbite results from the constriction of blood vessels in the extremities, decreasing the supply of warming blood. This drop in blood supply may result in the formation of ice crystals in the tissues, causing tissue damage. The symptoms of frostbite are white or grayish skin, blisters, numbness, mental confusion, failing eyesight, fainting, shock, and cessation of breathing. Death may occur from heart failure.

In temperatures of 20^{o} F or less (including wind-chill factor), field personnel should wear insulated coveralls, wool socks, and insulated steel-toe boots. It is advisable to wear polypropylene or comparable long underwear as well, as it will wick perspiration away from the skin and prevent a chill. To further protect personnel, saran-coated Tyvek may be worn over coveralls because it does not breathe well and will act to block wind from passing through the clothing beneath.

Various measures can be used to prevent frostbite and hypothermia. Danger of frostbite increases when one is tired or ill. Employees should not drink alcohol, smoke, or bathe immediately before going out into the cold air. When in the cold, they should move about and exercise fingers and toes. Tight clothing and personal metal items (e.g., earrings, rings) should not be worn.

First aid for hypothermia or frostbite is to move the worker indoors to a warm, dry area and warm the affected body parts with extra clothes or by immersing in warm (not hot) water. Discontinue warming when skin becomes flushed. Do not rub, apply heat to, or break blisters on affected areas. Exercise thawed areas and elevate frostbitten areas.

2.2.5 Heat Stress

Due to the proposed duration of field activities at the Kotzebue LRRS, personnel may also encounter temperatures above 70^{o} F. Personnel who must wear protective clothing while working in warm temperatures are subject to heat-induced physiological stress because little evaporative cooling can occur. Heat stress can result in minor symptoms such as heat rash and heat cramps, or in severe effects such as heat exhaustion and heat stroke. Heat rash is skin irritation resulting from prolonged contact with wet

clothing. It can be prevented by allowing the skin to dry completely during rest periods and by showering at the end of the work day. Heat cramps result from an excessive loss of body fluids and electrolytes. The symptoms of heat cramps are spasms in the abdomen or limbs. Cramps can be prevented by proper fluid and electrolyte replacement.

Heat exhaustion results from pooling of blood in the extremities and under the skin and inadequate return of blood to the heart and brain. Symptoms include pale, clammy skin; profuse perspiration; weakness; headache; and nausea. Heat stroke is a life-threatening condition that occurs when the body's temperature-regulating system no longer functions properly. Symptoms include hot, dry skin; a high fever (often 106^{o} F or more); dizziness; nausea; rapid pulse; and unconsciousness. Brain damage and death may follow if the body temperature is not reduced. A proper work regimen, adequate fluid intake, and electrolyte replacement are vital in the prevention of heat stress.

In temperatures of 70^{o} F and above, the following provides guidance for a work/rest regimen for personnel wearing Level C protection:

- 70^{o} to 85^{o} F - 15-min break for each hour of work.
- 85^{o} to 95^{o} F - 15-min break for each 45 min of work.
- Exceeding 95^{o} F - 15-min break for each 15 min of work.

If extreme temperature conditions are encountered, consideration should be given to rescheduling work for the cooler morning or evening hours.

If work must proceed in temperatures above 75 degrees F, the Site Safety Officer should take the following steps to monitor for heat stress immediately after workers have completed decontamination:

- Take oral temperature.
- Take pulse.

- Ensure that each employee slowly drinks at least 8 oz of cool water; diluted, unsweetened fruit juice; or diluted, commercial electrolyte replacement fluid (e.g., Gatorade).

If at the beginning of the rest period the oral temperature exceeds 99 degrees F and/or the heart rate exceeds 110 beats/min, the employee should be required to lengthen his rest period and drink additional fluids, and should be monitored carefully for symptoms of heat stress. If symptoms of heat stress occur, the affected employee may be cooled quickly using a cool water spray. The employee may not return to work until body temperature and pulse return within normal ranges. Any employee with an oral temperature greater than 102 degrees F should receive medical attention immediately.

An additional method of monitoring for heat stress is to check bodyweight at each rest break. One pint of fluid should be replaced for each half pound loss in bodyweight. The bodyweight loss for the entire day should not exceed 1.5 percent of total bodyweight at the beginning of the day.

2.2.6 Heavy Equipment

The Kotzebue LRRS site may present hazards due to moving heavy equipment, such as trucks, excavators, and drilling rigs. Such hazards include being run over by moving vehicles, or getting caught by drilling machinery. Employees conducting sampling or investigation activities near moving heavy equipment should be alert to these hazards. Sampling stations should be located clear of moving equipment. The Site Safety Officer may station someone along traffic routes to monitor for oncoming vehicles.

In addition, prior to commencement of drilling activities, the Site Safety Officer should determine the location of the emergency power cut-off button on the drill rig. The Site Safety Officer should inform all employees working in the vicinity of the drill rig of the location of this button. Then, in case of emergency, the button can be pushed by the closest employee.

2.2.7 Wild Animal Attacks

The wildlife of northwest Alaska present a potential hazard to project personnel. All personnel must be aware of the potential hazard and avoid potentially-dangerous encounters with wildlife. The wildlife most likely to present a danger to project personnel are bears (polar bears, black bears and brown bears), arctic foxes, and large marine mammals (e.g., sea lions and walruses).

2.2.7.1 Bears. Bears present a potential hazard at, and near, the Kotzebue LRRS. The site is in close proximity to Selawik National Wildlife Refuge. Black, brown, and polar bears are found within the refuge in low densities. Polar bears are top-level carnivores and typically demonstrate no innate fear of humans. Black and brown bears are also high-order carnivores, but will typically avoid human contact unless provoked, surprised, or if humans approach cubs. Bears are attracted to areas of human habitation by the presence of foodstuffs in garbage, and may become unafraid of human contact. Field personnel will avoid contact with bears. If a black or brown bear is sited, efforts will be made to avoid provoking or surprising the bear. No field team member will approach a bear or its cub for any reason. If a polar bear is sited in the vicinity of the Kotzebue LRRS, all field work will be suspended and field personnel will remain indoors until notified by the Site Safety Officer, the Technical Project Manager, or the Field Operations Manager that work may be resumed.

2.2.7.2 Arctic Foxes. Arctic foxes present a significant hazard to field team members. Foxes are normally shy and will avoid human contact. In northern Alaska, however, the Arctic fox is the largest single reservoir of rabies in the state. Team members must avoid contact with foxes during field operations. Healthy foxes will avoid human contact and will run if humans are encountered. Under no condition will field personnel attempt to feed, catch or touch live foxes. If a fox does not run away when it sees humans, it must be assumed that the animal is rabid. Over 75 percent of the foxes tested for rabies in the last ten years have been rabid. Dead foxes must not be touched or otherwise handled.

2.2.7.3 Large Marine Mammals. Groups of large marine mammals are known to frequent the coastal areas of northwest Alaska. Walruses and sea lions, while fascinating to see, can be provoked to attack if harassed. They can move surprisingly fast on land and very swiftly in the water. They can be expected to remain very near the water, but must be avoided.

2.2.8 Insect Bites

Biting insects are a serious health hazard in northwest Alaska during the summer months. The wet coastal areas surrounding the station are breeding grounds for extremely high populations of mosquitos and biting files. If unprotected, field personnel may be incapacitated by insect bites. Each team member will be issued a head net to keep insects away from the face and head. Long pants, long-sleeved shirts, and gloves are also effective in preventing insect bites. As with sunscreen, the use of insect repellent chemicals is essential to the health and safety of field personnel; however, care must be used to prevent

contamination of samples with repellent/propellant chemicals. The chemical content of all insect repellents used must be presented to the Technical Project Manager and/or Site Safety Officer for recording.

3.0 SITE WORKER TRAINING

Tetra Tech employees are trained in accordance with the OSHA requirements presented in 29 CFR 1910.120 and 1910.134. All field personnel, including the Technical Project Manager, Field Operations Manager, and Site Safety Officer have received 40 hours of training covering such topics as site safety plans; safe work practices; nature of anticipated hazards; handling emergencies and self-rescue; use of monitoring equipment; handling, storage, and transportation of hazardous materials; employee rights and responsibilities; use, care, and limitations of personal protective clothing and equipment; and safe sampling techniques. The Technical Project Manager, Field Operations Manager, and Site Safety Officer have also received eight additional hours of health and safety training for supervisors. All employees receive annual refresher training and First Aid/CPR training.

Tetra Tech employees are properly trained in the use of an air-purifying respirator, including its capabilities, limitations, and maintenance. As required under OSHA standards, all personnel must be qualitatively fit-tested prior to wearing a respirator.

The Site Safety Officer will be trained in the proper selection of respiratory protection and protective clothing, air monitoring instruments and techniques, confined space entry, drilling hazards, hazard recognition and evaluation, emergency procedures, and exposure symptoms for the contaminants of concern.

Prior to initial site entry, all employees will review and sign the site health and safety plan (Appendix A). A pre-entry briefing will be held onsite at the initiation of field activities. All personnel will be present, attendance is mandatory. Information to be discussed during the pre-entry briefing will include:

- Names of personnel and alternates responsible for site health and safety.
- Health and safety hazards present on the site.
- Use of personal protective equipment.
- Work practices by which employees can minimize risks.

- Safe use of equipment on the site.
- Medical surveillance requirements, including recognition of symptoms and signs that might indicate overexposure.
- Decontamination procedures.
- The emergency response plan.
- Drilling safety procedures.
- Spill containment measures.

Because of the potential for encounters with bears, the USAF has required that an armed safety watch trained in the safe handling and use of firearms be assigned to each field team or group during remedial investigation activities to be conducted at Kotzebue LRRS. All personnel acting as the safety watch must be trained in the safe handling and use of firearms.

The minimum firearm requirement is a 12-gauge pump shotgun loaded with 3-inch magnum hollow-point slug ammunition. Safety watchers will be responsible for visually surveying the vicinity throughout field activities for the presence of bears or other large carnivores, and for warning the work crew. The shotgun will be carried with a full magazine and an empty chamber with the hammer down. This reduces the possibility of accidental discharges of the weapon, but allows rapid chambering of a round if needed. If an aggressive bear or other large carnivore is encountered, and an attack appears imminent, the safety watch should shoot and kill the animal. Any incident involving the shooting of any wildlife in the field will be reported to the project manager, and the Alaska Department of Fish and Wildlife will be immediately notified. Bears shot in self-defense must be skinned and the head and hide surrendered to the state; this will be the responsibility of the safety watch.

Copies of this plan are available to subcontractors to inform them of hazards identified on the site, methods of controlling hazards, and emergency procedures. A pre-entry briefing will be conducted for each contractor that arrives subsequent to the initiation of field activities. Tetra Tech exercises authority and responsibility for its own employees.

4.0 PERSONNEL PROTECTION

Protective clothing and equipment are necessary to prevent contact with potentially hazardous concentrations of chemical agents. The minimum personal protective equipment (PPE) requirements by activity or location are expected to be:

- Site reconnaissance - Level D.
- Sampling - Level D.
- Drilling oversight - Level D.

PPE requirements are summarized by level in Table 2. Table 3 presents decision criteria for selection of PPE. The site safety officer is responsible for determining the appropriateness of PPE and making decisions concerning the upgrading or downgrading of PPE. If contaminants present a health risk as defined in Table 3, personal protective clothing may need to be upgraded.

TABLE 2. REQUIRED PROTECTIVE CLOTHING AND SAFETY EQUIPMENT
Page 1 of 2

LEVEL D

Protective Clothing
- Coveralls
- Gloves, if warranted
- Steel toe, steel shank leather or neoprene boots
- Safety glasses/goggles, if warranted
- Hard hat (with full length face shield, if warranted)

Safety Equipment
- Combination combustible gas/O_2 meter
- Photoionization detector
- Decontamination equipment
- Pressurized eyewash
- First aid kit

MODIFIED LEVEL D

Protective Clothing
- Polyethylene-coated or saran-coated (SARANEX) Tyvek coveralls
- Nitrilated butyl rubber (NBR) outer gloves
- Vinyl inner gloves
- Steel toe, steel shank neoprene boots
- Safety glasses/goggles, if warranted
- Hard hat, if warranted

Safety Equipment
- Combination combustible gas/O_2 meter
- Photoionization detector
- Decontamination equipment
- Pressurized eyewash
- First aid kit

LEVEL C

Protective Clothing
- Full-face, air-purifying respirator with combination organic vapor/HEPA dust cartridges
- Polyethylene-coated or saran-coated (SARANEX) Tyvek coveralls
- Nitrilated butyl rubber (NBR) outer gloves
- Vinyl inner gloves
- Steel toe, steel shank neoprene boots
- Hard hat, if warranted

Safety Equipment
- Combination combustible gas/O_2 meter
- Photoionization detector
- Decontamination equipment
- Pressurized eyewash
- First aid kit

TABLE 2. REQUIRED PROTECTIVE CLOTHING AND SAFETY EQUIPMENT
Page 2 of 2

LEVEL B

Protective Clothing

Self-Contained Breathing Apparatus (SCBA)
Saran-coated (SARANEX) Tyvek coveralls
Neoprene or nitrilated butyl rubber (NBR) outer gloves
Vinyl inner gloves
Steel toe, steel shank neoprene boots
Hard hat, if warranted

Safety Equipment

Combination combustible gas/O_2 meter
Photoionization detector
Decontamination equipment
Pressurized eyewash
First aid kit

[a] NIOSH/OSHA/USCG/EPA Occupational Safety and Health Guidance manual for Hazardous Waste Site Activities and Tetra Tech, Inc.

TABLE 3. DECISION CRITERIA FOR PERSONAL PROTECTIVE EQUIPMENT			
Agent(s)	Monitoring Instrument	Decision Level	Required Respiratory Protection
Combustible gas	Combustible gas monitor	0-<5% LEL 5-<20% LEL ≥20% LEL	Level D Level B Don Not Enter
Organics (volatile)	Photoionization detector or organic vapor analyzer	Background 1-5 units above background sustained in the breathing zone >5 units above background sustained in the breathing zone	Level D Level C Level B

5.0 MEDICAL SURVEILLANCE

In accordance with the Tetra Tech Corporate Health and Safety Program, all employees who may be exposed to hazardous materials in the course of their work are required to participate in the Corporate Medical Monitoring Program. All employees have received a baseline medical examination, including analyses of blood and urine for heavy metals. All employees are also certified as fit to work using a respirator. All employees are required to complete Tetra Tech Monthly Exposure/Injury Reports and to undergo routine, annual medical examinations. Medical examinations are conducted by an occupational medicine clinic in accordance with the requirements of 29 CFR 1910.120. If an employee suspects a chemical exposure, or has been injured, additional medical monitoring will be available and the employee must complete a Tetra Tech Employee Exposure/Injury Incident Report.

6.0 MONITORING

6.1 INITIAL SITE MONITORING

Field monitoring shall be conducted upon initial site entry to meet the following objectives:

- Determine existing or potential hazards that may affect public health, the environment, and Tetra Tech personnel.
- Verify existing information and gather additional site-specific environmental data.
- Collect supplemental information to determine the safety requirements for personnel entering the site.

Monitoring instrumentation for initial entry shall include the following:

- Photoionization detector or organic vapor monitor (for total organic vapors)
- Combustible gas/oxygen meter

The main focus of the initial monitoring is to rapidly identify immediate hazards and determine background concentrations. Upon initial site entry, the team will survey the site and monitor for organic vapors. Site levels shall be compared to decision level guidelines in Table 3 to determine whether it is necessary to modify the proposed levels of protection. All initial and periodic monitoring results shall be documented in the field logbook.

6.2 FOLLOW-UP MONITORING

Monitoring of the breathing zone shall be conducted at regular intervals throughout sampling activities for the detection of total organic vapors to ensure that personnel are properly protected. Monitoring will also be required if changing site conditions warrant. Specific monitoring instruments and decision levels are summarized in Table 3. Instrument calibration methods and quality control practices are specified in the accompanying Quality Assurance Project Plan.

6.3 PERSONNEL AIR MONITORING

Personnel air monitoring may be conducted to assess the airborne concentration of identified contaminants to determine appropriate health and safety requirements. The decision to conduct personnel air monitoring will be made by the Site Safety Officer, and will be based on area monitoring results, site characterization findings, or the need for additional information.

7.0 SITE CONTROL

The Site Safety Officer will establish the work zones (i.e., a command post, support zone, contamination reduction zone, and exclusion or control zone) to ensure that personnel are properly protected against hazards and that contamination is confined to appropriate areas. Work zones may vary and may require modification depending on field activities, field findings, and the prevailing wind direction. A map of the site showing the proposed onsite locations to be investigated is presented in Figure 4. There are three general areas of investigation, the White Alice Station, the Composite facility, and the POL Beach tanks. However, work zones will be established for each field activity within these general areas. All activities within contaminated areas (exclusion zones) shall be conducted with a partner.

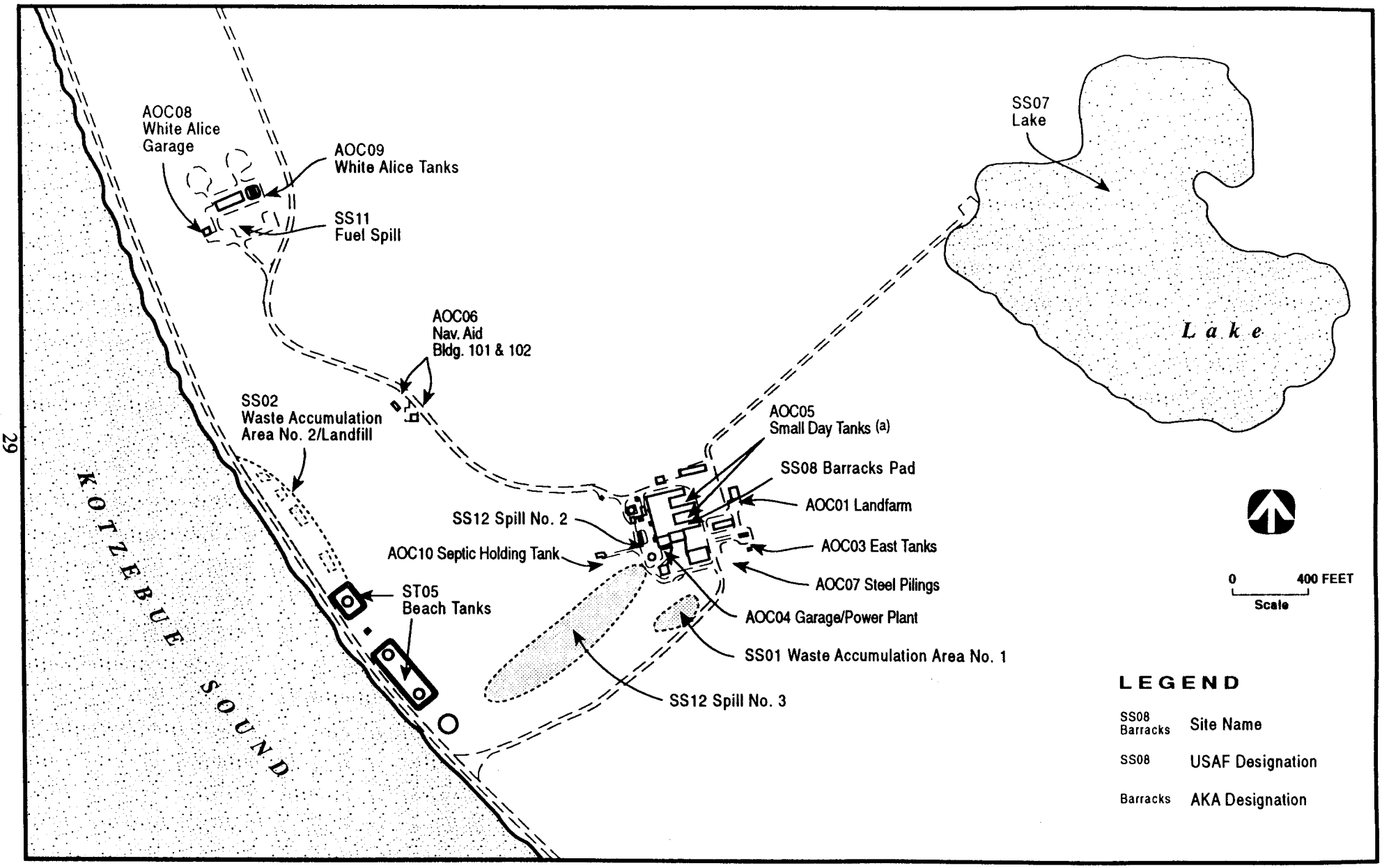

Figure 4. Areas of Investigation, Kotzebue LRRS, Alaska.

8.0 DECONTAMINATION PROCEDURES

8.1 PERSONNEL

Prior to commencing fieldwork, the Site Safety Officer will establish the decontamination layout and procedures for the site. All personnel leaving zones designated by the Site Safety Officer as potentially contaminated must follow the decontamination procedures established by the Site Safety Officer. Some of the protective clothing for Level D and Level C protection is disposable and should be removed, bagged and, if appropriate, disposed in accordance with local hazardous waste regulations. If non-disposable clothing is used, it must be decontaminated with detergent and water before reuse. If respirators are worn, they must be disinfected daily using the manufacturer-supplied disinfectant solution. All personnel should shower as soon as possible after leaving the site. Specific decontamination procedures for modified Level D and Level C are shown in Table 4. Equipment for decontamination measures may include 20- to 30-gal wash basins, plastic liners, plastic drop cloths, Alconox/decontamination solutions, rinse water, scrub brushes, towels, benches or stools, tape, and extra air tanks or face masks and cartridges, if warranted.

8.2 EQUIPMENT

The sampling equipment may need to be decontaminated with acids, solvents, or Alconox and water between sampling stations. If solvent or acid washes are performed, Level C protection must be worn. The Site Safety Officer will select respirator cartridges and protective clothing compatible with the decontamination solutions.

TABLE 4. DECONTAMINATION PROCEDURES

Modified Level D and Level C Decontamination

The following decontamination procedures will be followed:

Segregated equipment drop	Deposit equipment used onsite (e.g., tools, sampling devices and containers, monitoring instruments, radios, clipboards) on plastic drop cloths or in separate containers with plastic liners. Segregation at the drop site reduces the probability of cross-contamination. During hot weather operations, a cool-down station may be set up within this area.
Tape removal	Remove tape around boots and gloves, and deposit in container with plastic liner.
Outer glove removal	Remove outer gloves and deposit in container with plastic liner.
Suit, boot, and glove wash	Wash suit, gloves, and safety boots. Scrub with long-handled scrub brush and decontamination solution.
Suit, boot, and glove rinse	Rinse off decontamination solution with water. Repeat as many times as necessary.
Canister or mask change[a]	If worker leaves exclusion zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot covers donned, and joints taped. Worker returns to duty.
Safety boot removal	Remove safety boots and deposit in container with plastic liner.
Facepiece removal[a] (respirator)	Remove facepiece. Deposit in container with plastic liner. Avoid touching face with fingers.
Inner glove removal	Remove inner gloves and deposit in lined container.
Inner clothing removal[a]	Remove clothing soaked with perspiration and place in lined container. Do not wear inner clothing offsite.
Field wash	Shower if highly toxic, skin-corrosive, or skin-absorbable materials are known or suspected to be present. Wash hands and face if shower is not available.
Re-dress[a]	Put on clean clothes.

[a] Additional requirements for Level C decontamination.

9.0 RESIDUALS MANAGEMENT

Proposed RI/FS activities, including subsurface soil sampling, groundwater monitoring well installation, groundwater sampling, and decontamination of field equipment will generate investigation-derived wastewater and soils. The minimization of investigation-derived wastes is an important objective when planning the design of field sampling activities. Wastes derived during this investigation will be handled as described below.

- All decontamination wastewater will be containerized in drums, properly labeled and stored onsite. At the completion of RI/FS field activities, the decontamination wastewater will be pumped through an in-field carbon filtration system, recontainerized, and sampled to evaluate potential hazardous constituents. Disposal alternatives for decontamination wastewater will be determined based upon the chemical analysis of the samples.

- Wastewater generated during monitoring well installation and groundwater sampling will be containerized in drums, properly labeled and stored onsite. Water from individual monitoring wells will be segregated. Based upon results of the chemical analysis conducted on groundwater samples, disposal options for wastewater from each well will be determined. Non-contaminated water will be released to the environment. Contaminated water will be pumped through the in-field carbon filtration system, recontainerized, and resampled to evaluate residual hazardous constituents. Disposal alternatives for this filtered wastewater will be determined based upon the chemical analysis of the samples.

- Soil waste generated during drilling will be contained in drums, properly labeled and stored onsite. Alternatives for soil disposal will be evaluated based upon results of the chemical analysis conducted on soil samples. TPH contaminated soils may be added to the existing landfarm. Soils containing contaminants not identified in samples from the

landfarm will be placed in a separate containment cell constructed adjacent to the landfarm.

- Soil generated during handaugering will be returned directly to the shallow handaugered boring. These shallow borings cannot be advanced into the permafrost, and thus will not promote vertical migration of potential contamination.

Personal protective clothing, including eye protection, shall be worn during waste containerization because of contact and splash hazards.

All wastes containerized in 55-gallon waste drums will be segregated by type and matrix (soil, wastewater, etc.). The waste drums shall be sealed and secured at the end of each work day. The waste shall be labelled with a description of the waste matrix and location of origin (e.g. borehole number, etc.), the volume or quantity of waste, the activity that generated the waste, the date(s) generated, the site name, and the name and telephone number of the USAF contact. An onsite staging area for accumulation of wastes will be identified by the Technical Project Manager after consultation with the site contact. Tetra Tech will assist the USAF with the evaluation of the wastes for final disposition. However, the USAF is ultimately responsible for final disposition of the wastes.

10.0 CONFINED SPACE ENTRY

The identified RI/FS activities to be performed at the Kotzebue LRRS should not require any personnel to enter any confined space. Several of the designated tasks may, however, present the opportunity for a person to inadvertently enter a confined space. The hazards associated with confined spaces are of such severity that all personnel should be alert to potential confined space situations and be familiar with the requirements for confined space entry permitting and the general precautions and procedures discussed below.

A confined space is any space having a limited means of exit which is subject to the accumulation of toxic or flammable contaminants or that may represent an oxygen-deficient atmosphere. A confined space can include any pit or trench more than four feet in depth. The potential confined spaces at the Kotzebue LRRS include tanks, closed buildings, crawl spaces, and trenches. The potential hazards of confined spaces include the following:

- Atmospheres containing toxic materials in concentrations that are immediately dangerous to life or health (IDLH), such as solvent vapors, gases from the fermentation of organic matter, or products of combustion. Gases or vapors heavier than air are particularly prone to accumulation in confined spaces.

- Oxygen-deficient atmospheres (oxygen content of 19.5 percent or less) due to displacement by gases or vapors, decomposition of organic matter, or rusting of metal.

- Flammable atmospheres.

- Moving parts.

- Tripping or falling due to equipment, piping, or wiring.

- Poor illumination.
- Open electrical circuits (found in some confined spaces because people are rarely in proximity to the circuits).
- Limited exit.

Prior to any personnel entering a confined space, the Field Operations Manager along with the Site Safety Officer must prepare a Confined Space Entry Permit. The permit must include the following information:

- Identification of the confined space to be entered.
- The purpose of entry.
- The date and duration of the permit.
- A list of the personnel authorized to enter the confined space.
- The names of the current attendants and the entry supervisor.
- A list of the anticipated hazards.
- A list of the measures being used to isolate and eliminate/control these hazards.
- A description of acceptable entry conditions.
- Any pertinent test results.
- A list of the closes rescue and emergency services and their telephone numbers.

- The procedures to be used for communication between the personnel within the confined space and the attendant and/or entry supervisor.

- A list of the equipment required for confined space entry.

- Any other pertinent information and/or permits.

The permits must be approved by the Regional Health and Safety Officer. Once the permit has been prepared and accepted, the Site Safety Officer, or his designee, will act as the attendant. The attendant will be responsible for monitoring activities both inside and outside the permitted area, ordering personnel to exit the confined space, calling rescuers, and preventing unauthorized entry of the permitted area. The attendant should have appropriate protective gear to conduct a rescue if necessary. The attendant should never enter the confined space without alerting someone else onsite and providing for backup assistance. If someone becomes unconscious in a confined space, it should be assumed that the space supports an IDLH atmosphere and rescue should not be attempted without supplied air. Symptoms of oxygen deprivation are not always alarming to the victim, who may feel calm or even euphoric. The attendant must observe workers for symptoms of oxygen deprivation, such as lack of coordination or dizziness.

The Field Operations Manager will act as the entry supervisor. The entry supervisor is responsible for verifying that all procedures and equipment are in place and that rescue services are available. The entry supervisor also has the ability to terminate entry, cancel permits, remove unauthorized personnel from the permitted area, and determine that acceptable conditions as specified in the permit continue. Both the attendant and the entry supervisor will be onsite during confined space entry activities. The atmosphere within the confined space shall be tested for oxygen deficiency, combustible gases, organic vapors, and other potential contaminants, as required.

If the confined space was a storage or cargo tank, attempts should be made to determine the last three products stored there. It may be necessary to vent the space or to enter using supplied air. If venting is performed, monitoring must be performed afterwards to check the suitability of the atmosphere for entry. A confined space entry into an explosive atmosphere should be conducted only to correct life threatening conditions.

No personnel shall entry any confined space unless they are authorized to do so, they are listed on the entry permit, and both the entry supervisor and the attendant are present onsite.

Any person entering a confined space in Level B respiratory protection, must be attached to a lifeline. Also, personnel must not enter any confined space requiring the use of Level B respiratory protection, unless two backup people also equipped with pressure-demand, self-contained breathing apparatus (SCBA) are present.

It will be the responsibility of the Site Safety Officer to determine the appropriate response to an emergency incident. The response sequence will be to 1) remove all personnel from the hazard source, 2) perform decontamination and first aid measures as necessary, 3) assess the severity of the incident, and 4) contact appropriate emergency assistance.

11.1 PRE-PLANNING

The Technical Project Manager will verify with the Regional Health and Safety Officer that all field personnel have fulfilled the project training and medical monitoring requirements prior to fieldwork. The Site Safety Officer will notify local emergency services of field activities and potential chemical exposures prior to commencement of the field effort and will ensure that the emergency plan is compatible with applicable local, state, and federal emergency response plans. The Site Safety Officer will check to see that all required safety equipment is at the job site prior to the start of each day's field activities.

11.2 ACCIDENT PREVENTION

11.2.1 Weekly Health and Safety Inspections

A mandatory safety meeting will be held each Monday before field work begins. Attendance will be indicated by a dated signature on the sign-in sheet. Additional safety meetings, or safety briefings, will be held at the start of each new operation and any time it is deemed necessary by the Site Safety Officer, the Field Operations Manager, or any of their designees. Personnel are encouraged to bring any questions or concerns to the attention of the Site Safety Officer or the Field Operations Manager during these meetings.

General items to be covered in each meeting include the location of the nearest telephone for emergency reporting, a brief description of the work to be performed, special safety precautions necessary for the work to be done (a demonstration may be performed if necessary), a question and answer period, and discussion of other subjects as deemed appropriate by the Site Safety Officer, the Technical Project Manager, or the Field Operations Manager.

11.2.2 Accident/Incident Reporting Procedures

All field workers are required to notify the Site Safety Officer or the Field Operations Manager of any suspected exposure. In the event of an injury or suspected exposure, the Site Safety Officer will contact the appropriate hospital and ambulance service if necessary.

As soon as possible after an injury or suspected exposure, the Site Safety Officer will investigate the circumstances surrounding the injury or exposure and institute measures to prevent recurrence.

11.3 EMERGENCY RECOGNITION AND COMMUNICATIONS

The following visual signals will be used for emergency communication onsite:

- Hand clutching throat: out of air; can't breathe.
- Hands on top of head: need assistance.
- Thumbs up: OK; I'm alright; I understand.
- Thumbs down: no; negative.
- Grip partner's wrist or both hands around partner's waist: leave area immediately.

If abnormal or unexpected actions or conditions are noted by anyone, the observer will immediately alert the Site Safety Officer. The Site Safety Officer, or in his absence the Field Operations Manager, will determine the appropriate course of action.

11.4 INJURY OR EXPOSURE

Employees are required to notify the Site Safety Officer of any injuries or suspected exposures. The Site Safety Officer will determine the appropriate course of action and notify hospital and ambulance service, if necessary, using the emergency numbers listed in Section 7.0.

If a person is injured or exposed within in the exclusion zone, the Site Safety Officer will determine the cause of the incident, if possible, and the appropriate response actions to be taken. If it is not possible to determine the cause, or if the cause is a chemical overexposure, the Site Safety Officer will order an evacuation of the exclusion zone. If the injured person can be moved without life-threatening harm, they will be removed from the exclusion zone. If the injured person cannot be moved, the Site Safety Officer will dispatch a rescue team with appropriate equipment bearing in mind the short duration of exposure during a rescue. If appropriate equipment is not available, rescue should not be attempted. Once the injured/exposed person is removed from the exclusion zone, additional movement should be minimized.

First aid/CPR will be administered as necessary during patient transport, decontamination, and until emergency medical personnel arrive and assume responsibility, or until the patient arrives at the hospital. General first aid guidelines for chemical exposures are listed below:

- Inhalation exposure: remove patient to fresh air.
- Spill on skin: remove contaminated clothing and rinse affected area with plenty of clean water.
- Splash in eyes: rinse eyes with plenty of clean water for at least 15 minutes. Lift the upper and lower lids to irrigate the entire eye.
- Ingestion: Do not induce vomiting unless the substance has been positively identified and a container label, chemical information sheet, or medical personnel advises it. It is usually safe for the patient to drink water to dilute the substance. Do not have the patient drink anything but water unless the container label, chemical information sheet, or

medical personnel advises it. Never give water or anything else by mouth to an unconscious patient. Acute ingestion exposures are extremely rare on hazardous waste sites where employees are following appropriate safe operating procedures.

The injured/exposed person should be decontaminated to the fullest extent possible if a chemical exposure is suspected. If only limited, or if no decontamination is possible (e.g., in the case of an open wound), a blanket or similar material should be placed around the person. The Site Safety Officer will notify all attending medical personnel of the nature of the patient's condition and will ensure that all articles coming in contact with a contaminated patient are covered with an impervious, preferably disposable, material.

The Site Safety Officer, or his designee, will accompany the patient to the hospital. A copy of the Site Safety Plan should be provided to attending emergency medical personnel. Medical treatment advice can be obtained from the Agency for Toxic Substance and Disease Registry (ATSDR) or the Centers for Disease Control, accessed using the telephone numbers provided in Section 7.0.

As soon as possible after an injury or suspected exposure, the Site Safety Officer shall investigate the circumstances surrounding the injury or exposure and file a Tetra Tech Exposure/Injury Incident Report with the Regional Health and Safety Officer. This report will include recommendations on how to prevent the occurrence of similar events.

11.5 BLOODBORNE PATHOGENS EXPOSURE CONTROL PLAN

None of the tasks proposed at the site are expected to result in worker exposure to bloodborne pathogens. However, there is a potential for field team members to be exposed to bloodborne pathogens if they are required to administer emergency first aid to a co-worker onsite.

The following precautions will be taken by all field team members required to administer emergency first aid:

- Prior to administering first aid to a bleeding victim, the first aid provider's hands must be covered with two pairs of latex, surgical type gloves.

- The first aid provider shall make every effort to avoid coming into contact with the victim's bodily fluids during administration of first aid and/or transport of the victim.

- During administration of rescue breathing or cardiopulmonary resuscitation (CPR), the first aid provider shall use a protective mask to minimize contact with the victims bodily fluids. If a protective mask is unavailable, the provider shall conduct rescue breathing or CPR through the closest available clean cloth (e.g. part of a shirt, etc.).

- As soon as practical following administration of first aid, the provider shall thoroughly wash his/her hands.

- The first aid provider shall not eat, drink, apply lip balm, handle contact lenses, or conduct any hand to face activities prior to washing his/her hands.

- All personnel shall avoid contact with any materials which become contaminated with the victim's bodily fluids. These materials shall be lifted using mechanical/remote means and shall be placed in a durable, leakproof container with an orange biohazard label.

Persons involved in initial contact with a bleeding victim onsite will make every effort to avoid coming into contact with the victim's bodily fluids.

11.6 SPILLS OR CONTAMINANT RELEASES

In the event of a contaminant spill or release, the onsite USAF spill prevention plan will be instituted and the Technical Project Manager will notify appropriate representatives and authorities as specified in the plan.

12.0 EMERGENCY CONTACTS

Site Address or Description of Location

Kotzebue LRRS
Kotzebue, Alaska
(The station is located 4 miles south of Kotzebue, Alaska)

Site Phone or Nearest Local Phone and Description of Location

(907) - - Administration building
Onsite Contact - NA

Nearest Hospital: Address and Phone

Maniilaq Medical Center/Hospital
333 Shore Avenue
Kotzebue, Alaska
(907) 442-3321
In case of Emergency, ask for the Emergency Room

Directions to emergency centers are outlined in the emergency route map - Figure 5.

Emergency Transportation Systems

Police Department	911
First Aid	911
Ambulance Service	911
Fire Department	911
U.S. Coast Guard	1-800-478-5555

Tetra Tech Corporate Resources

Technical Project Manager Rick Osgood	Work: (206) 883-1912 Home: (206) 644-9406 Local: (to be completed when local accommodations are acquired).
Assistant Technical Project Manager David Hose	Work: (206) 883-1912 Home: (206) 788-2560 Local: (to be completed when local accommodations are acquired).

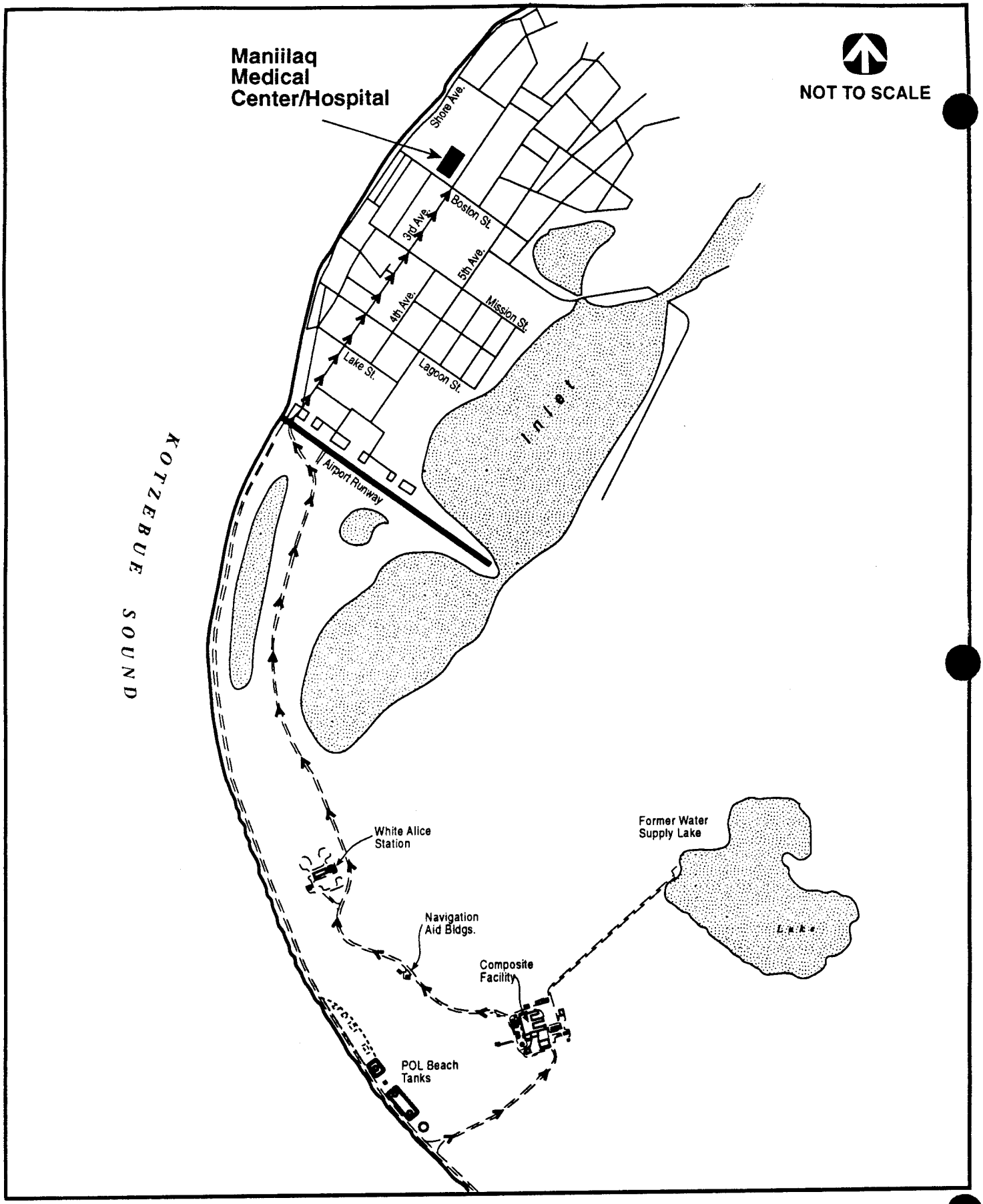

Figure 5. Emergency Route Map, Kotzebue LRRS, Alaska.

Site Safety Officer Randal Dyer	Work: (206) 883-1912 Home: (206) 670-1653 Local: (to be completed when local accommodations are acquired).
Regional Health and Safety Officer Carlotta Frommer	Work: (206) 883-1912 Home: (206) 935-9013

AFCEE/ESRU

Mr. Samer Karmi (Alaska Restoration Team Chief)	Work: (210) 536-5297

611 CES/CEVR

Mr. Michael Rhoads	Work: (907) 552-4532

Other Resources

Chemtrec	1 (800) 424-9300
Superfund/RCRA Hotline	1 (800) 424-9346
ATSDR	1 (404) 639-3311 (day) 1 (404) 329-2889 (night)
Poison Control Center	1 (800) 732-6985

APPENDIX A
SITE SAFETY PLAN CONSENT AGREEMENT

TETRA TECH, INC.
SITE SAFETY PLAN CONSENT AGREEMENT

I have reviewed the Tetra Tech, Inc. Site Safety Plan for the RI/FS to be performed at the Kotzebue LRRS. I understand its purpose and consent to adhere to its policies, procedures, and guidelines while an employee of Tetra Tech.

Employee Signature	Date
Employee Signature	Date
Employee Signature	Date
Employee Signature	Date
Employee Signature	Date
Employee Signature	Date

Copies of this page, with signatures of all field personnel will be submitted to the Tetra Tech Regional Health and Safety Officer (Carlotta Frommer).